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DISK SYSTEMS FROM OHIO SCIENTIFIC

An introduction to mass storage for small computers

Every computer system requires a mass storage device to hold programs and data. In most applications the performance of the mass storage device is actually more critical than that of the computer itself. That is, system performance is generally limited by the mass storage peripheral and not by the CPU or RAM memory, etc.

There are several storage devices to select from when buying a computer system and Ohio Scientific offers three of these; the audio cassette, floppy disk and hard disk. Ohio Scientific does not offer paper tape, digital cassette or mini-floppy disk as storage devices because of their severe limitations.

With a paper tape device both a reader and a punch is required for this primitive system. Noisy and time-consuming, the paper tape is not reusable and is far less reliable than other systems. Paper tape can also be easily destroyed by humidity, dust, oil and mishandling.

Another storage device Ohio Scientific does not offer is the digital cassette. This device has all the limitations an audio cassette system has in addition to a high price tag. Special recorders and expensive tape make this system with remote transport controls as expensive as floppy disk systems which have much higher performance.

The mini-floppy disk is still another storage device that fails on a cost/performance comparison basis with other systems. The mini stores 80,000 bytes per diskette whereas a full size floppy (8") stores 250,000 bytes per disk for only slightly more at retail.

For the beginner Ohio Scientific offers audio cassette systems for mass storage. The audio cassette system uses an inexpensive recorder and tape which is generally very reliable. However, this system is extremely slow

and requires manual operation. The audio cassette system is not practical for data storage, although it is much better than a paper tape system for the beginner.

C-DI, C-D2 Floppy Disks from Ohio Scientific

Computer systems with disks are far more usable in virtually all applications of computers than systems using other mass storage devices. The big advantage with a disk system is that the position of programs and data on the disk can be identified and used to access data very quickly.

Ohio Scientific offers both a single and a dual drive floppy disk with its computer systems. The single-drive floppy disk is an excellent mass storage device for the personal computerist, industrial development system or educational system.

With our new OS-65D floppy disk operating system (standard with all assembled disk systems) all of the disk control functions are done in software instead of hardware resulting in a system with a high degree of flexibility at low cost.

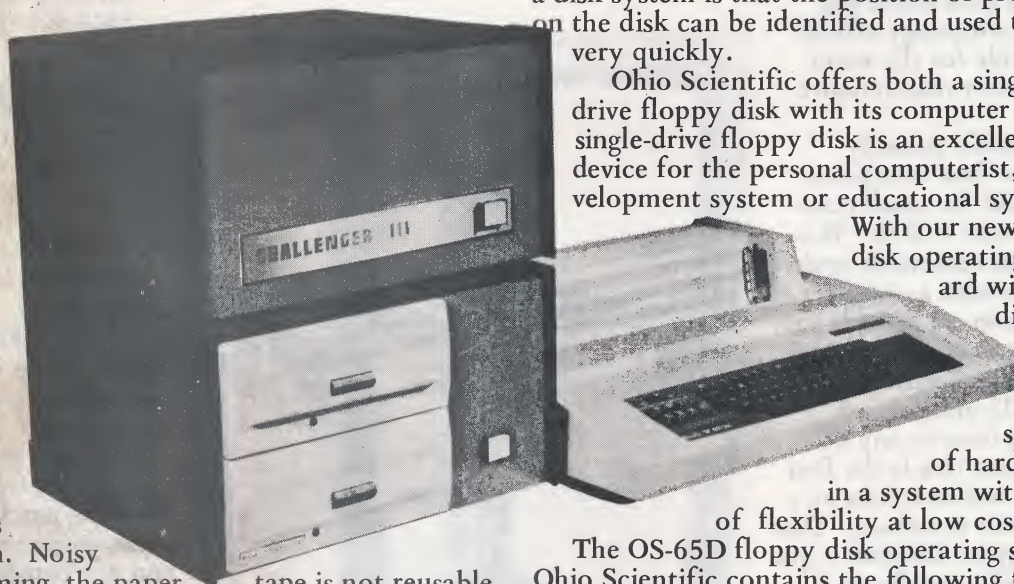
The OS-65D floppy disk operating system from Ohio Scientific contains the following fully integrated systems:

- BASIC with disk files
- Assembler/Editor
- DisAssembler
- Extended Debugger
- Relocator
- Disk Copy Utilities
- I/O Distributors

OS-65D can also store up to 247 kilobytes of information per disk surface and contains multiple mixed sector length files which can be opened simultaneously. This is important because the user can match sector length to his desired record length thereby minimizing mechanical movement resulting in high speed operation.

Sectors can range from 256 to 3.2K bytes in length in 256 byte increments. OS-65D is also fully compatible with our floppy disk bootstrap PROM so that the user can use the disk immediately on system powerup.

continued



There are three ways to buy a floppy disk from Ohio Scientific. The first is the 475 Kit. This kit includes a fully assembled GSI Model 110 Floppy disk drive and fully assembled and tested 4 foot 50 line connecting cable, the Model 470 Disk Controller Board complete with all parts (kit), Floppy Disk Bootstrap PROM and the OS-65D Diskette including 8K BASIC for Disk.

For operation the user must place the Floppy Disk Bootstrap on his cpu board, assemble the 470 Controller, provide +5 at 1 amp and +24 at 2 amps for the disk and optionally an enclosure.

The kit comes with the above mentioned for \$749.

Another way to buy a floppy disk from Ohio Scientific is the fully assembled Single Drive Floppy

Disc, C-D1. This disk is the same as the 475 Kit spec wise, but comes fully assembled including an attractive Challenger type case and UL recognized power supply for +5 and +24 volts (Bootstrap PROM must be ordered separately). Price of the C-D1 is \$990 plus \$29 for prom.

The third way to buy a floppy disk from Ohio Scientific is the C-D2 which is the same as the C-D1 except that it has 2 floppy disk drives for 500,000 bytes of on-line storage. Price of the C-D2 is \$1590 plus \$29 for PROM.

Please note that OS-65D and BASIC require just over 12K of memory providing about 3700 bytes of BASIC workspace in a 16K computer (minimum size recommended for Disk Computers).

THE HARD DISK!

C-D74 from Ohio Scientific

Until now, the floppy disk was the ultimate storage device for a small computer. Recent technological developments have made big system disk technology affordable and reliable for the small system not under maintenance contract.

Ohio Scientific proudly announces the first Winchester technology disk for small computers, the model C-D74. This disk uses a non removable sealed chamber drive with a unique rotary positioner to provide the highest performance disk drive available. Besides providing an unbelievable 35 millisecond average access time to any of 74 million bytes, this is the first drive to offer twelve tracks on a cylinder without reseeking. That means that any of 220,000 bytes can be accessed typically in 5 milliseconds! The C-D74 interface and controller are designed with the same philosophy as our floppy disk controller so that much of the interface consists of software and not hardware.

The main controller difference between the big disk and the floppy is that the C-D74 has a 7 million bit per second transfer rate, which is much too high for any micro-computer to handle, whereas the floppy uses programmed data transfers.

The so-called Winchester technology was first developed by IBM. This technology uses disks which are housed in a sealed, clean-air environment with the heads eliminating the major cause of crashes—contamination.

The heads are always precisely aligned to the disk allowing ultra-high density formats. The disks have special landing and launching areas for the heads so that when the power is off, the heads deliberately come to rest on the disk surface.

(in the picture at the right, the rack is not included with the C-D74)

As the disk comes up to speed, the heads lift off the disk by the natural air cushion and are moved into position over the magnetic area of the disk. This feature eliminates power cycling head crashes and the costly and less precise head retractors of other disks.

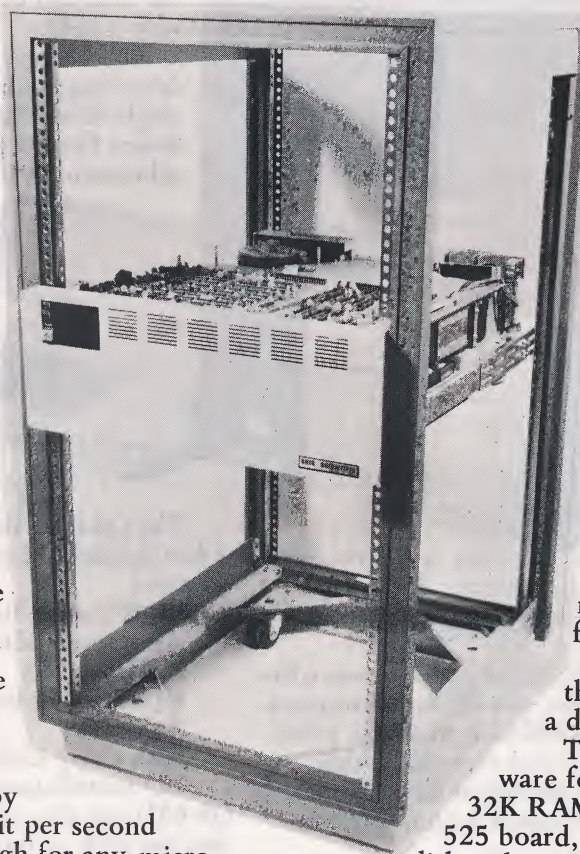
The C-D74 has important applications in both business computing and research in computing itself. It makes small computers practical for much larger jobs than formerly thought feasible, particularly since most business computing is disk-bound and not compute bound.

The C-D74 can store all the records of a medium size company for instant access. The Winchester technology of the C-D74 means that the drive can be run 24 hours a day without worry of disk wear.

The recommended minimum hardware for the C-D74 is a Challenger with 32K RAM and at least 8K on a Dual Port 525 board, and a single or dual-drive floppy disk. The C-D74 must be mounted in a 22" deep standard equipment rack which can also house Ohio Scientific Challengers (17" wide) conveniently on the rack shelves (see picture).

Here are some C-D74 specs :

- 74 million bytes storage (unformatted)
- 10 millisec. single track seek
- 35 millisec. average access
- 75 millisec. maximum access
- 7.3 megabits/sec data transfer rate
- \$6,000 FOB Hiram, OH



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